A

PRACTICAL DESCRIPTION

OF THAT PROCESS CALLE

THE DAGUERREOTYPE;

THIS PROCESS CONSISTS IN THE SPONTANEOUS REPRODUCTION

OF THE

IMAGES OF NATURE,

RECEIVED IN

The Camera Obscura,

NOT WITH THEIR COLOURS, BUT WITH GREAT NICETY IN THE GRADATION OF SHADES,

BY M. DAGUERRE,

PAINTER, INVENTOR OF THE DIORAMA, OFFICER OF THE LEGION OF HONOUR, ETC.

TRANSLATED BY J. P. SIMON, M.D.

A Native of France.

MEMBER OF THE ROYAL COLLEGE OF SURGEONS IN LONDON, EXTRA LICENTIATE OF THE DUBLIN LYING-IN HOSPITAL, AND MEMBER OF THE PROVINCIAL MEDICAL ASSOCIATION; LECTURER ON VARIOUS BRANCHES OF PHYSICAL SCIENCES, AND ON THE DAGUERREOTYPE ETC.

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TO

CHARLES HASTINGS, ESQ., M.D.,

FOUNDER OF THE

MEDICAL AND SURGICAL PROVINCIAL ASSOCIATION, ETC., WORCESTER,

This small Pamphlet,

IS MOST RESPECTFULLY AND GRATEFULLY DEDICATED,

BY

HIS MOST HUMBLE AND SINCERELY OBLIGED SERVANT,

J. P. SIMON, M.D.

PREFACE.

Struck with the important discovery of my countryman M. Daguerre, I resolved not only to make myself acquainted with his beautiful and interesting process of producing photographic drawings, but of making it a prominent subject in my future lectures on the various branches of Physical Science I have had the honour to treat upon, before the British Public, these last six years. I do not mean to give a full translation of the interesting details contained in Daguerre's historical and practical description of the Daguerréotype processes, and of his diorama, published by himself, but will confine myself principally to the description of the several steps required to arrive at the desired end, trusting (being myself only a native of France) that any phraseological errors will be smoothly passed over by my benevolent and critical readers.

I hope therefore no apology will be required on my part for the attempt I have made to translate a subject of such vast importance, and which occupies the attention of almost every scientific man in Europe at this moment, and which has conferred the greatest honours on its inventor by a no less person than the Monarch of his own country, and has deserved him the sanction, support, and approbation of two of the greatest scientific characters that France ever produced,

viz., M. M. Arago and Gay-Lussac. I am aware that the subject has already been ably and at full length translated by an Englishman of high repute in the law. But those who may honour me with their presence to witness my Daguerreotype experiments, will naturally feel disposed to peruse any short account of the process as may be brought before them by me (who may be allowed to understand the niceties and full meaning of certain idiomatical phrases belonging to my native tongue, which few English born could boast of understanding sufficiently to be enabled to give a correct translation of any French work without the aid of a native). I hesitate not to say that I feel confident every true lover of the fine arts and of science will anxiously and eagerly avail himself of every opportunity to make himself acquainted, if not master, of the Daguerréotype process, so delicate, so simple, and so beautiful in all its forms.

"Light is that silent artist,
Which without the aid of man
Designs on silver bright
Daguerre's immortal plan."

J. P. S.

October 30th, 1839.

ADVERTISEMENT.

In 1814, M. Niepce was engaged in finding out the means of fixing the images brought under the focus of the Camera Obscura, but more particularly in the copying of such engravings as were more readily put under the influence of light.

In 1824, M. Daguerre was also engaged in making experiments on light, for the sole purpose of fixing the image of the Camera Obscura, considering, as he did, that the copying of engravings by such processes, was of no import in the advancement of the arts.

In 1829, M. Daguerre joined M. Niepce to perfect his last process. M. Niepce had named his own discovery, Heliography, and had written the description of it, to submit it to M. Daguerre, that he might make improvements upon it. M. Daguerre has thought it proper to join to this notice some Notes, which contain the observations that he made to M. Niepce at the time of his communications. These Notes were not written with an intention to criticise, but only to give a just idea of the nature of that discovery, which might appear, from the description of its author, to have attained that degree of perfection to which it does not pretend, notwithstanding the improvements it underwent.

The Fundamental Principles of Heliography, by M. J. N. Niepce.

Light, in its composing and decomposing state, acts chemically upon substances. It is absorbed,

and combines with them, and imparts to them new properties. Thus, it augments the natural consistency of some such substances; it solidifies them, and renders them more or less insoluble in proportion to its intensity, and to the duration of its action upon them.

Such is, in a few words, the principle of M. Niepce's discovery.

Before I proceed in giving the description of the Daguerréotype process, I deem it incumbent on me to lay before my readers the importance attached to M. Daguerre's invention, by his Majesty the King of the French, and by the nation.

A Bill for Rewarding the Inventors of the Daguerreotype.

LOUIS-PHILIPPE, King of the French,

To all present and to come, Greeting.

We have commanded, and do command, *That the bill, preparatory to a law*, the substance of which follows, shall be presented in our name, to the Chamber of Deputies, by our Minister, the Secretary of State for the Home Department, whom we charge to explain the objects of the bill, and to support them in debate.

Article First.—The provisional agreement, concluded on the 14th June 1839, between the Minister of the Interior and M. M. Daguerre and Niepce, jun., is annexed to the present law, and approved.

Article Second.—An annual pension of 6,000 francs (£240 Sterling) is granted to M. Daguerre for life, and to M. Niepce, also for life, the sum of 4,000 francs (£160.)

Article Third.—These pensions shall be inscribed in the Book of Civil Pensions on the public Treasury, the same to be enjoyed from and after the passing of the present act. They shall not be subject to deductions, and one half of the said pensions shall be reversible to the widows of M. M. Daguerre and Niepce.

Given at the Palace of the Tuileries, the 15th June 1839.

(Signed) LOUIS-PHILIPPE.

By the King.

The Minister Secretary of State.

(Signed) DUCHATEL.

I will conclude all narration respecting the merit of the invention, by submitting also the report made to the Chamber of Peers on the 30th of July 1839, by M. Gay-Lussac, in the name of a Special Commission, (composed of M. M. le Baron Athalin, Besson, Gay-Lussac, Le Marquis de Laplace, Le Viscomte Siméon, Le Baron Thénard, Le Comte de Noé), charged with the examination of the bill respecting the purchase of the process from M. Daguerre, for fixing the images of the Camera Obscura.

GENTLEMEN,

Whatever contributes to the progress of civilization, and tends to ameliorate the physical or moral welfare of man, ought to be the constant

object of the solicitude of an enlightened government, which, even at the height of its grandeur, does not forget to bestow honourable rewards on those who aid in this noble task, and whose happy efforts are crowned with success.

It is thus that already do the law and guardians of property in literature and the useful arts, secure to the inventors advantages proportionate to the services they have rendered to society; a mode of remuneration so much the more just, so much the more honourable, that it resolves itself into a contribution absolutely voluntary, in exchange for the services they have rendered, and that, independent of the caprices, or whims of favours.

However, if such a mode of encouragement is the best in the most part of circumstances, there are cases in which it is impracticable, or at least inadequate, whilst other great discoveries demand the most marked and solemn testimonies.

Gentlemen (or my Lords), Such appears to us the discovery of M. Daguerre, and such has it been thought of by his Majesty's government, who have made it the subject of a bill now submitted for your approbation, and has also been laid before the Chamber of Deputies, who have given their legislative sanction to the bill. The discovery of M. Daguerre is known to you, Gentlemen, from the results that have been just under your notice, and from the report made by the illustrious "*Savant*" (M. Arago), to the Chamber of Deputies, to whom the secret had been intrusted, which is the art of fixing the images produced by the Camera Obscura on a metallic surface, and there to be permanently fixed.

However, we must hasten to state, that (though we wish not to reflect on the merit of that beautiful discovery), the design of the artist (*light*) is not replete in colours, "*black* and

white" being the composition of the whole. The natural image, varied in colours, may remain long, and perhaps for ever, a hidden mystery to human sagacity. Yet let us not rashly say that it is impossible; for the success of M. Daguerre unfolds to the world a new order of possibility. Requested to give our opinion on the importance and consequences of M. Daguerre's invention, we have formed it on the perfection of the results. On the report of M. Arago himself, to the Chamber of Deputies, and on recent communications which we have received, both from the "*Savant*" (M. Arago) and of M. Daguerre himself. Our conviction on the importance of that new invention is complete, and we should be glad to find the House participating in the same feelings. It is certain that, from the discovery of M. Daguerre, physical science is now put in possession of a chemical re-agent, sensible, in a very extraordinary degree, to luminous rays or influences, of a new instrument, which will become, for the intensity of light, and all the phenomena of the luminous bodies, that which the microscope is for minute objects, and that it will give rise to new researches and new discoveries.

Already this re-actif has received the most delicate impressions by the feeble light of the moon; and M. Arago has conceived the hope, that a lunar chart may be traced by that satellite herself.

This House has had an opportunity of convincing itself by the proofs that were submitted to its inspection, that bas-reliefs, statues, monuments, in a word, inanimate nature, can be rendered, with a perfection unattainable otherwise, since the impressions taken by M. Daguerre's process are the faithful images of Nature herself.

The perspective of a landscape, and of every object, is traced with a precision and mathe-

matical exactness ; nothing, no not even the smallest object can escape the eye and pencil of the new painter "*light*," and as only a few minutes are required for the perfection of its work, a field of battle in all its phases will be represented with a perfection inaccessible by any other means.

Artificial arts for the representation of forms— the designs for perfect models of perspective, as well as the distribution of light and of shadows— the natural sciences for the study of species and their organization will surely make of M. Daguerre's process numerous applications. In short, the problem of its application to the taking of likenesses is nearly resolved, and the difficulties which remain yet unconquered are weighed and can leave little doubt of their being overcome. Nevertheless it must not be forgotten that coloured objects are not reproduced with their proper colours, and that the various luminous rays not acting alike on M. Daguerre's re-actif, the harmony of shades and of lights, or luminous rays, in coloured objects is inevitably altered. This is a point of demarcation traced by nature herself to the new process.

Such are, my Lords, the acquisitions already secured and the most sanguine hopes of M. Daguerre's discovery, nearly realized. It was however necessary to inquire as to the nature and the execution of the process and the commission has thought that it could not be obtained in a surer and more authentic manner than through the mouth of the Honourable Deputy in whom M. Daguerre had originally placed his confidence ; and at a later period M. le Ministre de L'intérieur (the Minister for the Home Department), M. Arago, at the invitation of the President of the Commission, came and has confirmed by new details, or explanations, what he had stated before in his

interesting report. Thus it is certain that the execution of M. Daguerre's process requires but very little time, (so M. Gay-Lussac says, but I am not quite of his opinion, as even my little experience has taught me the process in England is extremely nice and tedious and would sometimes require the patience of an *angel*,) and a very moderate expense, (that is, *provided* we do not obtain our machine and instructions to use it from our fortunate young countryman, M. de ———, who without scruple charged me £40.)

After the first outlay for the apparatus, which, without plates for receiving the images, may be fixed at 400 francs (£16), the duty is 20 per cent, carriage, freight, &c.; the whole with six plates comes in this country to about £22. Every one is sure to succeed after a few trials, (M. Gay Lussac says,) but who will presume to be so sagacious as the celebrated Savant, M. Arago himself, who after having been initiated in the secret, has executed a masterpiece which no doubt your Lordships would have been glad to see had it not

Note. I beg my readers to notice particularly that I have spared neither time, trouble, nor expense, to render this pamphlet practically useful and worthy of their notice. I have, first, considered attentively the author's meaning; and I have written, not literally, but according to the meaning and sense of the work. A careful and attentive perusal will soon convince them of the fact.

Where gentlemen and ladies living in country residences, wish to possess the Daguerrian Apparatus complete, I shall feel happy to take all risk of procuring the same for £25, and £5 extra for private instruction to use it, if required. This Instrument in the gentle and skilful hands of a lady, fond of drawing, and particularly where there is a large family, will afford an incalculable source of amusement and recreation, in being able to obtain, any fine day, any favourite object from nature, which will become a most important and faithful guide to copy, and will prove one of the quickest and most efficient masters to arrive at perfection, in the mathematical proportions required to represent nature. I shall be happy, if required, to take the Photographic Drawing of any Gentleman's Castle or Seat, by private agreement.

been consumed by the flames at the destruction of the Diorama.

Were farther testimonies required the reporter (self) of your commission, my Lords, might add that M. Daguerre has also been pleased to intrust the secret of his process to him and that he has described all the stages of the operation to him. He can state that the process is not expensive and that it can easily be executed by those least versed in drawing or painting, and M. Daguerre has engaged himself to publish the process, as it is in his interest that the process should succeed, it cannot be doubted but that M. Daguerre has most at heart to make it known. Your reporter, my Lords, will still add that although he has not repeated himself the process as his Honourable friend, M. Arago, he trusts to the sincerity of it by the confidence that has been made to him, (in order to arrive at the degree of perfection brought forth by M. Daguerre) as having been a most difficult object to find out, and must have cost much time, trials without number, and especially a boundless perseverance, which only excite to emulation and which zeal is only to be found in great and persevering minds.

The process is truly composed of several successive operations, not appearing necessarily depending the one on the other, and of which the result does not become apparent immediately after either of them, but solely at the termination of the last process ; and certainly had M. Daguerre been disposed to keep this secret to himself, or to confide it only to persons on whom he could depend, he need not have apprehended that any (*blue stockings*) one might have taken it from him, (that is, might have found it out.) It will be perhaps inquired, and indeed the question has already been put, Why, if the process was such a

hard thing to find out, did not M. Daguerre endeavour to keep it to himself? And why do the laws, so wise, which protect the rights of authors as much as the public peace, and government resolved to purchase it in order to throw it open to the public? We will reply to these two questions.

The chief advantage of M. Daguérre's process consists in obtaining quickly, and in a most correct manner, the image of objects, whether it be to preserve it, or to reproduce (or copy) it afterwards by engravings, or by lithographic means; from this it will appear, that if only concentrated in the hands of a single individual, an invention like this would not have had sufficient scope to unfold its merits; whilst on the contrary, if freely given to the public this invention will receive in the hands of the painter, of the architect, of the traveller, and in the hands of the naturalist, numberless applications. In short, in the possession of a single individual, it would have remained a long time stationary (that is, unpropagated) and would have faded away (or been forgotten) perhaps. On the contrary in the hands of the public, it will grow (or improve,) and will ameliorate itself by the aid of all; thus under such circumstances it became important that it was made a public property. On the other hand, the invention of M. Daguerre ought to have attracted the attention of the government, and induced it to confer on him a marked and solemn reward.

To those who are proud of national glory (*as the liberals of this country say*), and who know, that a people do not shine over other nations, but in proportion to the greater progress that they are enabled to make in the advancement of civilization; towards such, it will be observed, the process of M. Daguerre must be a great discovery. He is the origin of a new art, in the midst of an old civilization, which will be a marked data or

event, that will be considered and preserved as a title of national glory. And would one see it descend to posterity surrounded by ingratitude?

Let it on the contrary come rather as a marked testimony of the protection of the Chambers, of the government of July, and in fine, of the whole country, who stand the protectors of great discoveries. It is, in fact, an act of national munificence which grants the bill in favour of M. Daguerre; we have given him our unanimous assent, but not without noticing how great and honourable a reward is, when voted by the country; and this we do, in order to remind the people, not without some regrets, that France has not always shown herself so grateful, and that too many and useful works, too many works of genius have often procured for their authors but a barren glory. They are not accusations that we wish to imply, they are errors which we can only deplore, and which we must endeavour to avoid in future. My Lords, having appreciated as much as it was possible, the importance of M. Daguerre's discovery, we are convinced, that it is novel, full of interest, promising much for the future, and finally, that it is worthy of the high favour and of the national remuneration which has already been voted to him by the Chamber of Deputies. The commission has been unanimous to adopt the bill, purely and simply in all its forms, and as their reporter I am charged to propose it to your Lordships.

DAGUERREOTYPE.

DESCRIPTION OF THE PROCESS.

THE designs are executed upon thin plates of the purest silver, plated or soldered on copper. (*Supposed* to be one part of silver to fifteen of copper).

The union of these two metals is required to the perfection of the effect. The thickness of the copper should be sufficient to keep the perfect flatness of the plate, in order not to distort the images, but care must be taken that the copper be not too heavy. The thickness of the two metals ought not to exceed that of a stout card.

The process is divided into five operations.

1st. The first consists in cleaning and polishing the plate to prepare it to receive the sensitive coating on which the light is to trace the design.

2nd. The second is to apply this coating.

3rd. The third, is to place in the camera obscura the plate prepared to receive the action of light, in order to receive the image of nature.

4th. The fourth to cause to appear this image, which is not visible as it is taken out of the camera obscura.

5th. The fifth has for its object to remove the sensitive coating, which would otherwise continue to be acted upon by light, and would tend necessarily to destroy the design altogether.

FIRST OPERATION.

Preparing the Plate.

For this operation are required a small phial of olive oil, some very fine carded cotton, a small muslin bag containing some very finely powdered pumice-stone; the muslin to be sufficiently fine to allow the pumice powder to pass through easily in shaking it over the plate.

A phial of diluted nitric acid, one part of acid to sixteen of water by measure.

A frame of three-legged iron wire, about four inches high, on which the plates are placed to be heated by means of a spirit-lamp, which is part of the apparatus. As we have noticed above, the designs are produced on plated silver. The

size of the plate is proportionate to the size of the apparatus. First, it is necessary to give it a fine polish; for that purpose some of the pumice-powder must be shaken out of the bag on the plate, taking care not to touch the plate, and then with some cotton moistened with a little olive oil, the plate is to be rubbed very gently regularly, and *rounding* the moves as if describing circles (or extending helices); for this operation the plate is to be put on clean sheets of paper, which must be renewed from time to time. Pumice powder must be shaken on the plate several times, and to change the cotton often. The mortar for pounding the pumice-stone must be of porphyry. The powder is afterwards refined by grinding it upon glass with a glass muller, and using very pure water; and care must be taken not to use the pumice-powder before it is thoroughly dried. It is easy to conceive how important it is that the pumice-powder be sufficiently fine to be rubbed on the plate without making any mark, since it is on the perfect polish of the plate that the beauty and perfectness of the picture depends. When the plate is well polished, it must be powdered again, and rubbed with dry cotton to remove the greasy oil, always rounding the hands or fingers, as above described, till every mark will have disappeared. It is quite impossible to obtain a good result, unless the above directions are strictly attended to. Now, a small pleget of cotton is to be made, and moistened with a little dilute nitric acid, as mentioned before; by applying the cotton to the mouth of the small bottle, and inverting it, taking care to moisten only the top of the pleget. Very little of the acid is required, and care taken that the finger touch not the acid, then the plate is to be rubbed all over, that the acid be properly spread over its surface; the cotton muts be changed, and rubbing always rounding in order to spread well the acid

coat, which however is to be but slightly rubbed on the surface of the plate. It will be observed, that the acid will divide itself into small globules on the plate, which must only be removed by fresh plegets of cotton, rounding and rubbing in such a gentle and regular manner as to diffuse equally the acid; for the places on which the acid does not act will leave spots on the picture and spoil the whole. When the acid will have been properly diffused on the plate, a white film (or veil like) will be observed all over its surface; then again pumice powder is to be shaken on the plate, and rubbed regularly and gently with a fresh pleget of cotton. Then it should be placed on the three-legged iron frame, (made out of thick wire) and exposed to a strong heat with the spirit lamp, moving it regularly under its surface, the silver kept uppermost, the heat to be continued for at least five minutes, when it will be observed, that a whitish coating will be formed on the surface of the plate, the heat must be discontinued.

The heating of the plates may be effected by a small charcoal fire, which will even be preferable, insomuch that the operation will take less time. In this case the iron frame becomes useless. The plate being then placed on fire tongs, and moved regularly over the charcoal fire, so as to impart an equal heat all over its surface. It will be known when it has acquired the proper degree of heat, by the appearance of the whitish coating above mentioned. As it has been stated elsewhere, the temperature of the plate is to be reduced as quickly as possible; and this will the soonest be effected, by placing the plate on a large cold metallic surface. (I use the back of the tinned copper dishes which serve for the washing of the picture, the final operation.) As soon as it has cooled, it must be polished anew, which is speedily done, since it is only necessary to remove the

slight whitish coating that the heat has produced on the silver. For this purpose, pumice powder is shaken on the plate, and, with a fresh pleget of cotton, is rubbed, without any oil or acid. Pumice is put on several times, changing often the cotton. When the silver is well browned, it should be rubbed as before with the diluted acid, and add a little pumice powder, rubbing gently with the cotton pleget. Then *twice* more the acid, and carefully repeating the same process of rubbing and drying each time, avoiding to touch the plate with any part of the cotton that might have come in contact with the fingers, as the perspiration would show so many spots on the picture. To avoid also breathing on the plate, or let the least particle of saliva to fall upon the plate, which would likewise occasion spots on the design. (It will be seen, that the acid is to be used four times in all; and had I had the good fortune of reading my translation before I read the pamphlet of M. Daguerre, which did not come into my hands until M. de ——— had *secured my name on paper,* I should certainly have saved the £18 I reluctantly paid to him for my *soi-disant* instruction.)

Should it not be desirable to operate immediately, the diluted acid is to be applied twice only, after having heated the plate. That allows this part of the operation to be prepared beforehand. But it must be remembered that the acid is to be, at least once more, applied previous to exposing it to the sensitive coating of the iodine; pumicing it as before-mentioned, removing all particles of dust that remain on its surface.

SECOND OPERATION.

For this operation, are required, the iodine box, Pl. 2, Fig. 1: 2 is the small deal board intended

to hold the polished plate, which is carefully slided under small metallic bands forming grooves fixed with small nails on each side of the board, one at the end; lastly, one fixing it altogether as in a picture frame. It is then placed on the four angles or corners 3, 3. Having first removed the inside lid 4, 4, and *carefully* placed the iodine saucer 5, in which the iodine, just covering its interior surface, has been *carefully* flattened all over, so that not a particle will rise above another, which if not attended to will direct more iodine vapour on one part than on another, and create a deep spot or star-like, that would subject the operator to go through the whole process over again. The small gauze cover 7, is then to be placed over the iodine saucer 5, in the bottom of the box 8, 8. Of course it is easy to understand that the silver surface is to be inverted so as to face the iodine saucer, that it might be exposed to its vapour which forms the sensitive coating. The time to leave the plate exposed to the iodine vapour ends when it has acquired a fine golden colour, which will take from 10 to 30 minutes. If allowed too long the coating will appear of a violet colour, which must be carefully avoided, as it is not so sensible to light. If on the contrary the coating was not deep enough the image of nature would not become imprinted with the same facility. Thus the golden colour is its proper shade, being the only favourable colour for the success of the operation. The temperature of the room, where the operation is conducted, will much contribute to determine the time—of course, the warmer it is the quicker will the coating appear. It is then necessary and important to look every six or eight minutes, turning the small board each time, and the golden colour will determine the time. Care must be taken that the temperature of the interior of the box be the same as that of

the room; otherwise, passing from cold to warmth, damp or moisture would precipitate itself on the coating, which would be hurtful to the production of the effect. The more the box is used the sooner is the coating obtained; for this reason, that the interior of the box, the wood itself being penetrated by the vapour of iodine, the coating on the surface of the plate is not only sooner effected but more equally diffused. This will show the importance of leaving always some iodine in the small saucer, keeping the box in a dry place, and always replacing the middle lid 4, 4. After each operation it becomes evident from what has been said that the box is preferable after it has been used several times, since the process is much shortened by it. It will be understood that this operation must be practised in a dark room, as any powerful ray of light thrown upon the plate, while looking at it to observe the progress of the coatings, would instantly spoil the whole. The feeblest light is therefore only to be permitted just enough to discern the colour; turning the plate from end to end at each observation.

From the above description the process may appear very difficult; but with some practice in a very short time one becomes acquainted with the required time to obtain the yellow colour, and also the necessary dexterity in so quickly turning the plate as not to allow the light to act upon it.

As soon as the plate has acquired the necessary tinge, it must be carefully placed on the small black board, 2 Fig. 2, Pl. 2, the silver upwards, and quickly placed in the black frame Pl. 1. 5, 5, silver facing the blackened inside doors 2, 2, which is carefully kept from the light by turning upon them the small bolts 3, 3, which are however to be opened, just in the act of placing the frame in the camera obscura and the same wooden board,

holding the metallic plate is prevented from coming off behind the frame 5, 5, by small brass springs turned upon it. The room during that process must be kept dark, allowing only the light of a taper, which will be sufficient to enable the operator to go through the various stages; and even that feeble light must not be allowed to strike upon the plate, as it would be quite sufficient to cause spots that would render the picture imperfect. It is necessary to allow as little time as possible to elapse between the second and the third operation, which is that of adjusting the camera obscura; the delay for that operation must not exceed one hour, or else the combination of the iodine on the silver will not retain the same property.

OBSERVATIONS.

Before making use of the iodine box 8, 8, Pl. II, Fig 1, its interior should be carefully wiped. turning it upside down that every particle of dust and iodine that might adhere to the wood, may fall off, avoiding to touch any particle of iodine that would stain the fingers. The small gauze lid or cover of the iodine saucer 7, is intended to secure the iodine, and to regulate its evaporation, at the same time to prevent any particle flowing up in the act of closing the lid 1, Pl. 2, which might be easily produced by the sudden compression of the air, and which, reaching the plate, would make considerable spots upon it. For this reason we must bear in mind to close or shut the lid (after having placed the plate) with very great precaution, as the least shake may cause a particle of iodine to flow up and destroy all.

THIRD OPERATION

The apparatus required for this operation is simply the camera obscura Pl. I, Fig. 1. This third operation consists in placing the camera to receive the object from nature, as much as possible to direct it towards such objects as are lighted by the sun (or on which the sun shines) which will, under such circumstances, accelerate the operation. It is easy to conceive that the result of this operation, depending only on light, is quick in proportion to the degree of light thrown upon the objects, and the effect will be greater if they are naturally white.

The most important point is to adjust the camera obscura to the proper focus, so that the objects will be reflected perfectly clean and distinct on the looking-glass 6, Pl. I, Fig 1, which is restrained at its proper angle by the wire 5, which forms part of the frame 9, 9, which being fixed by the little bolts, the objects are painted on the ground-glass 4, Fig 1, and reflected on the mirror. This desired focus is attained by sliding to and fro the inside box 3, 3, which being obtained, the sliding-box is secured or fixed in that place by turning the thumb-screw 7. Then the frame is gently removed and replaced by that which contains the plate, and which also fits exactly in the camera obscura.

The frame being properly secured in its place, the aperture of the acromatic telescope is closed by turning the brass stopper upon it, then the inside little doors are thrown open by means of the semi-circles; then the plate finds itself ready to receive the impression of the view or objects chosen for the purpose; it only remains to consult a watch. This operation is extremely delicate, nothing being visible, and that it is quite impos-

sible to determine the time necessary to produce the effect, since it entirely depends on the intensity of the light reflected by the objects intended to be reproduced; the time in Paris may vary from *three* to *thirty* minutes at the most. It is also necessary to observe that the season of the year, the hour of the day, have much influence on the rapidity of the operation; the most favourable time is from seven o'clock in the morning until three in the afternoon, and that which is obtained in Paris in three or four minutes during the month of June and July will require five or six minutes in the month of May and August; seven or eight minutes in April and September, and so on in the same proportion according as we advance in the season. This is only a general view of the case holding good for objects well exposed to light, for it often occurs that twenty minutes are required in the most favourable months of the year. When objects are distant or not well reflected by light, it will then be seen, from what has been said, that it is absolutely impossible to state, for certain, the time that may be required to obtain the designs, yet with a little practice it is easy to attain that object. One will readily conceive that in the south of France and generally in all countries where light has the greatest intensity, for instance in Spain, in Italy, &c. the images or pictures ought to appear proportionably quicker.

Care must be taken not to allow more time to elapse than is necessary for the reproduction of objects, because the white or lighted parts of the pictures would no longer remain so; they would become blackened by the too prolonged action of the light, whilst on the contrary if it had not remained a sufficient time the design would be indistinct and without minutiæ, or details. Supposing that a first trial had failed by with

drawing it from the camera obscura too soon, or by leaving it too long a time, we should begin another immediately and we are much more sure, then, to succeed. It is even useful, in order to gain experience, to go through several trials without any decided object or success. Here we are similarly situated as we were respecting the Iodine Golden coating, viz., to lose as little time as possible to subject it to the fourth operation, as soon as it has been removed from the camera obscura (the plate). The delay must not exceed one hour, and the success of the operation is much more to be depended upon when it can at once be transferred into the mercurial box, Fig. 2, Pl. II.

FOURTH OPERATION.

For this operation are required, a bottle of distilled quicksilver containing at least two pounds weight, a spirit lamp, and a long glass funnel.

The quicksilver is poured gradually through the long glass funnel into the small iron cup, 6, which quicksilver ought nearly to cover the bulb of the centigrade thermometer, 5. From this moment all kind of strong light must be withdrawn; a lighted taper however, will be necessary. On the small grooved black board, 2, is then fixed the plate which has just been exposed to light and on which no trace of any picture can be observed. This black board, 2, is then very carefully placed on the inclined sides or supports of the box so fixed as to describe an angle of 45°. The quicksilver can easily be seen through the pane of glass, 4; then with great caution the lid is closed so as not to excite any motion that might cause any particle of mercury to ascend. When everything has been so disposed the spirit lamp

is then lighted and placed under the iron saucer, 6, containing the quicksilver, and it is allowed to remain there until the thermometer indicates 60°. centigrades, then the lamp is immediately withdrawn ; if the temperature has been raised quickly it will continue to rise though the lamp has been taken away; care must be taken that it does not indicate a temperature exceeding 75°. The image from nature exists on the plate, but it is not visible, it is only after a few minutes that it begins to make its appearance; this may be ascertained by looking through the glass, 4, Fig. 2. Making use of the small lighted taper, taking care not to allow even its feeble light to stay too long a time on the plate, as otherwise it would induce marks on the design. The picture must be allowed to remain in its place until the thermometer has descended to 45°., it is then withdrawn and this operation is completed. When the objects taken were powerfully lighted by the sun, and that the light of the taper has been permitted to act a little too long whilst in the camera obscura, it happens that the operation is at an end, even before the thermometer has reached 55 degrees downwards. This may be obtained by looking through the glass 4. It is necessary, after each operation, to wipe carefully the interior of the box, in order to remove the slight coating of mercury, which is generally there as the residuum of the operation. The same precaution must be observed respecting the small black board on which the plate was fixed, that no mercurial vapour should remain upon it. When the instruments are required to be packed, the mercury must be taken from the iron cup, 6, and allowed to flow out by the iron stop-cock, 7, into its bottle. The design will not bear to be looked at by too strong a light, in order to see if the process has succeeded. It is then removed from the

little deal board, by removing the small metallic bands, which must be carefully cleaned with pumice powder and water, and this is to be done after each experiment. It is easy to conceive that these small metallic bands should be cleaned, having been exposed to the iodine coating, and having received part of the design. The plate is then carefully introduced into the grooved-box, or plate-box, Plate II. Fig. 3, until time permits of subjecting it to the last and fifth operation, which may be postponed for several months, as the picture will remain in that state, (provided, however, that it is not looked at too often, and with too great a light), without suffering or undergoing any alteration.

FIFTH OPERATION.

The object of this fifth operation is to remove the iodine coating from the plate, which otherwise would continue, by being too long exposed to light; to decompose itself, and finally destroy the picture. For this operation, a saturated solution of muriate of soda, or common salt is required, or, what is better, a weak solution of hypo-sulphate of pure soda. The solution of muriate of soda, if used, is to be filtered, to free it from any particle of dirt that would spoil or mark the photographic drawing; two tinned copper dishes, sufficiently large to hold the plate, are required, and form part of the Daguerréotype apparatus. The saturated solution of muriate of soda is to be heated nearly to the boiling point; it is also necessary to have about one quart of nearly boiling distilled water; one of the tinned copper dishes or pans is filled to about one-third or less of the heated salt-water. The solution of hypo-sulfite of soda is preferable, inasmuch that it dissolves the adherent iodine much quicker, and

removes it completely. The solution of hypo-sulphate has this advantage, that it does not require to be heated, and that much less is required, just enough in the dish to cover the plate. First, it is necessary to dip the plate in the metallic dish that has the pure water (heated); it is only required to plunge it to and fro, two or three times, and then to withdraw it; then, before it has had time to dry, it must be plunged into the salt-water, or solution of hypo-sulfite of soda. Were not the plate to be first plunged into pure water, either of the two solutions would not fail to cause spots on the picture. The plate is then moved to and fro in the solution, and this facilitates the complete removal of the iodine. It is moved thus by means of a small tinned brass hook, as the fingers are too large, and would perhaps damage the edges of the picture. When the yellow colour has entirely disappeared, the plate is removed from the solution with great care, and is instantly plunged in the basin or metallic pan containing the pure water, avoiding to put the fingers on the drawing. Now, about a quart of boiling distilled water is to be kept in readiness, in a perfectly clean jug; the plate is then removed from the metallic pan, and is placed on one of its angles or corners, on a japaned or painted tin dish, inclined, or supported nearly in the vertical position, similar to a table music-stand, and is to be placed on the corner of a table. Its form is nearly square, being about an inch and a half deep at its upper end, and two and a half at its lower, and one foot wide, having two iron wires or flat pieces of brass soldered inside, as the two legs of a triangle, and on which the plate rests in an angular position. The rim of the dish, at its lower extremity, is inclined or bent inwards, to prevent the splashing of the distilled water when poured on the plate. This dish has a bent tube

of one inch and a half diameter, and is about a foot long. This serves to let the water run out according as it is thrown on the surface of the drawing, and is received in any convenient vehicle. The distilled water is poured on the plate not quite boiling. The object of this operation is to remove any of the solution, whether of muriate of soda or of hypo-sulphate of pure soda, which is already much weakened and diluted by its former immersion in the pure hot water.*

It is rare that, after having poured that quantity of hot water on the plate, that some drops do not adhere to its surface. In such a case, they must be dispersed before they have had time to dry up; for they might contain some particles of either common salt or of iodine. The best way to get rid of them is by blowing them off strongly with the mouth. It is easy to understand how important it is that the water used for that washing be pure; for, notwithstanding the quickness with which it ran on the surface of the plate, if it contained the slightest impurity, the consequence would be, that innumerable and *ineffaceable* spots would be left on the picture. In order to satisfy one's self that the water is pure, one drop of it may be poured on a polished plate, and if it evaporates by the aid of a spirit-lamp, and does not leave any residuum, it may be used without apprehension. Distilled water leaves no mark.

After this washing the experiment is at an end. It only remains to keep the picture free from any dust or vapour, which might tarnish the surface of the silver. The quicksilver that traces the picture is in a great measure decomposed. It adheres to the silver, it resists the water that is thrown upon it; but it will not bear rubbing. In

* Should the hypo-sulphate solution have been used, the distilled water ought not to be so hot as if the solution of muriate of soda had been used in the first immersion.

order to preserve the pictures, they must be put under glass in a frame, and properly secured by bands of paper glued on their edges. They then are unalterable, even to the action of the sun. As it would be nearly impossible, in travelling, to frame up every picture, they can very well be preserved by keeping them in a grooved box, similar to the one, Plate II., Fig. 3. For greater safety, they might be prevented from touching each other, by glueing little bands of paper all round their edges.*

In conclusion, it is necessary to observe, that the plated plates can be used several times, and for as long as the copper does not appear through the silver surface. Yet it is most important to remove, at each new operation, all the mercury, as it has been stated before, with pumice and oil, and changing the cotton often; for otherwise the mercury adheres to the silver, and the images obtained on this amalgum are always imperfect, because they want animation and distinctness.

* The author has tried to keep the pictures by means of various varnishes, such as amber, copal, Indian-rubber, of wax, and other resinous substances; but he remarked, that the application of any varnish diminished the intensity of the shades, at the same time that the prominent points of the picture were hidden. To this inconvenience the mercury was decomposed, by its union with the varnish employed; and this effect, which did not take place before two or three months after, entirely destroyed the picture. Moreover, the circumstance alone, of the varnishes destroying the intensity of the lights, was sufficient to induce the author to reject them, since the most desireable object in the process is to increase that intensity.

FINIS.

EXPLANATION OF THE PLATES.

PLATE I.—THE CAMERA OBSCURA.

Fig. 1.

1, Microscopic apparatus or acromatic lens. 2, 2, The outside case. 3, 3, The inside sliding case. 4, Ground glass. 5, The hooked brass wire to keep the looking-glass, 6, at its proper angle. 7, Brass thumb-screw, to fix the sliding case when the focus is found. 9, 9, Length of Camera Obscura.

Fig. 2.

1,1, Doors of frame to throw open in the Camera Obscura, when the plate has been fixed behind to receive the objects. 2, 2, Places through which the semi-circles, made of brass, are made to slide, 3, 3, Little bolts, to represent the doors to open before the frame is fitted into the Camera Obscura.

Fig. 3.

2, 2, Side view of the two little doors, as laid open when inside the Camera. 1, 1, The brass semi-circles, which, when pushed forwards, open the doors, and expose the plate to the light for receiving the objects; drawing them back, shuts the doors. 4, Is the small board holding the plate. 5, 5, Is the frame itself.

PLATE II.—IODINE BOX.

Fig. 1.

1, Cover or lid. 2, The small deal board holding the polished plate, which is to be placed on the four angles of the Iodine box inside. 4, 4, Inside lid kept in when the process of vapouring is terminated to prevent

PLATE I.

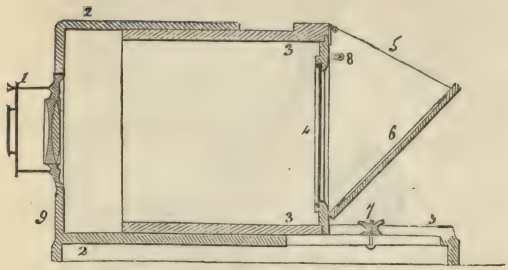

Fig. 1.

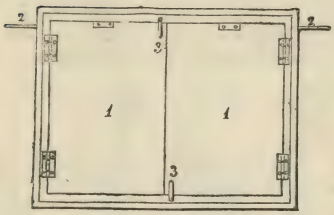

Fig. 2.

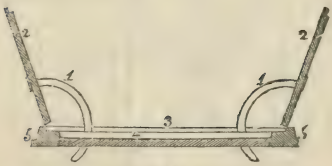

Fig. 3.

PLATE II.

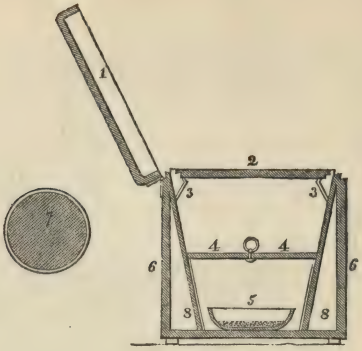

Fig. 1.

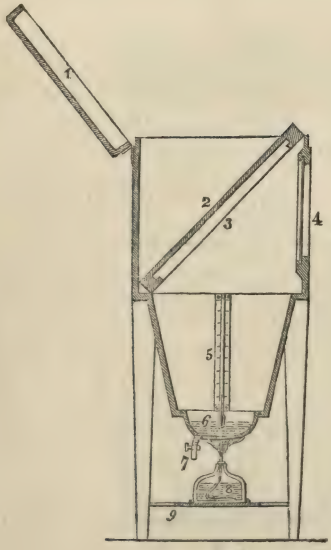

Fig. 2.

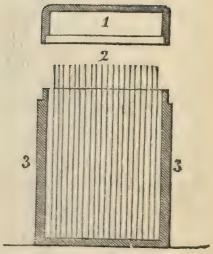

Fig. 3.

the iodine vapour from diffusing itself in the room where it is kept. 5, The small wooden saucer to hold the iodine. 7, The small gauze lid to place over the iodine saucer to prevent the flowing of any particle of the iodine, and more equally diffuse the vapour. 6, 6, Represent the size of the box outside, or its perspective. 3, 3, The small supports at each angle of the box, on which the board and plate are supported. 8, 8, Form of the iodine box.

FIG. 2.

1, Cover or lid of mercurial box. 2, The small black board for holding the plate. 3, The plate which is placed on the side grooves at an angle of 45 degrees, when it faces the mercury. 6, The iron saucer for holding the quicksilver. 5, The scale of centigrades thermometer. 7. The iron stop-cock to let out the quicksilver, when the operation is done. 4, Is the small semi-circular pane of glass, to look at the plate to observe the first appearance of the picture. 8. The spirit-lamp and flame. 9, The transverse board for holding the spirit lamp, whilst under the iron saucer to raise the temperature.

FIG. 3.

The box in which grooves are made to receive the plated plates to secure them from touching each other. 1, The rabbited lid. 2, The plates in their places. 3, 3. Outside or perspective of the box.

In a separate box made with partitions are 1, The spirit-lamp. 2, Small box of lucifer-matches. 3, Box holding the muslin bag and pumice powder tied in it. 4, A small box of nails to fix the small metallic bands to retain the plate in its place on the small deal board. 5, A glass funnel to pour the spirit of wine in the spirit-lamp. 2nd, row. 6, The iodine bottle. 7, The quicksilver bottle, 8, The olive oil bottle. 9, The diluted nitric acid bottle. 10, The small silver measure for the iodine. 3rd. row. 11. Spirit of wine bottle. 12, Solution of *hypo-sulfite* of pure soda. 13. Bottle of pumice powder. 14, Crystals of hypo-sulfite of soda.

I have been thus particular, as I have confined myself to two plates instead of six, satisfied I am that they are all that is required for an outside view of the whole, inasmuch that those of my readers who may wish to procure an apparatus, may obtain it complete from either M. Giroux, or M. Lerebourg, in Paris.

NOTES OF THE TRANSLATOR.

In order to satisfy the curiosity of those who wish to know the subjects I profess to lecture upon, when required. I beg here to subjoin them.

1st, On the Circulation of the Blood.

2nd, On the Physiology and Diseases of the Nervous System.

3rd, On Electricity, on a large scale.

4th, On Galvanism.

5th, On Terrestial Magnetism, comprising the use of the Mariner's compass, etc.

6th, On Electro-magnetism, on a large scale.

7th, On Pneumatics, treating of the mechanical, chemical, and salutary properties of air.

8th. *Now* on the DAGUERREOTYPE. (To scientific institutions and schools, if required.)

9th, On Toxicology or poisons, with an introduction of my self-acting instrument, (invented in 1826 in Dublin) for extracting poisons or other fluids from the stomach, which I successfully used in four cases of poison (wilfully taken by four young females.) The same instrument is so contrived as to inject fluids into every organ of the human frame, and is well adapted to inject the ears, in cases of protracted deafness arising from an accumulation of hardened wax, etc. This instrument I had the honour of exhibiting before a meeting of medical gentlemen of the first rank in Dublin; their num-

ber amounted to more than thirty, and before whom I performed an experiment on the living human subject, (This experiment took place at my house, No. 20, Talbot Street, Dublin, on the 19th of July 1827, at 4 o'clock), and I had the honour to receive from them the following certificate:

"We the undersigned certify, that we have this day, at four o'clock, witnessed an experiment of a most important nature on the human living subject, by Dr. Simon, who introduced the tube of his *self-acting instrument* into the stomach of a man, he had procured for that purpose, extracted thirty-two ounces of fluid, (the man had previously been made to drink,) and removed the tube in the short space of *twenty seconds*, without having produced any sickness or inconvenience to the man operated upon.

"We beg, therefore to recommend the use of an instrument that will prove of general utility to mankind, and we wish Dr. Simon every success."

The principal names affixed to this certificate are

PHYSICIANS.

Dr. Perceval, M. D. Late Physician-General in Ireland.
Sir Henry Marsh, Bart. M. D.
Dr. J. Clarke, M. D.
Dr. Jackson, M. D. State Physician.
Dr. Wm. Stokes, M. D. Prof, at the Meath Hospital.
Dr. Martin Toumy, M. D. Prof. Trinity College
Dr. Barker, M. D. Professor Trinity College.
Dr. Towsand, M. D.
Dr. Allman, M. D. Professor Botany, Trinity College, etc.
Dr. La Batt, M. D. &c. &c.

Sir Philip Crampton, M.D. Bart. Surgeon-Gen. etc.
Abraham Colles, Esq. Prof. Surgery, etc. etc. at the Royal College of Surgeons, in Ireland.
Robert Peile, Esq. Surgeon Dept. Insp. at the Royal Hospital, etc.
Richard Carmichael, Esq., Prof. and Clinical Lecturer at the Richmond's Hospital, etc etc.
—— Cusack, Esq., Prof. Surgery, etc., at St. Stephens' Hospital, etc.
—— O'Beirne, Esq., Surgeon Extraordinary to the king, etc.
R. Wilmot, Esq., Professor at the Meath Hospital,
T. Hewson, Esq. Professor, Meath Hospital
—— Harrison, Esq., Professor Royal College Surgeons, Ireland. etc. etc.

This same instrument I had the honour to exhibit before his late Royal Highness the Duke of Gloucester, and his Royal Highness the Duke of Sussex, (at whose command it was) at one of his Royal Highness's soirées in 1834, at Kensington Palace, where I had the honour of being personally introduced by Sir Astley Cooper, Bart., to his Royal Highness the Duke of Sussex, President, then, of the Royal Society.

I had also the honour to exhibit it to the Lord Lieutenant of Ireland and his lady, Phœnix Park, (their Graces the Duke and Duchess of Northumberland.)* At that time I was the State Cupper in Dublin, and Director of the *Electrical* Wellesley Dispensary, from which quarter I wish I had *never* moved, for I say "long live the *Irish* for

* The reason why the self-acting instrument was not made more generally known was owing to its being rather expensive, and to the intention I had of taking a patent for it, apprehending however that the profits to be derived from its sale (unless very considerable) would scarcely repay for the trouble of getting it manufactured on a large scale, and for the heavy expense of the patent, it was dropped. But I have determined to make it known (as much as shall lie in my power) for the benefit of all ranks of society.

their hospitality to strangers." I will be asked, why have you left it? My answer will be, because I was "a goose," not to use the more vulgar expression; I am deeply sorry for it, and I hope a chance may yet offer of my going back. I have cupped thousands of them, and among others one Lord Lieutenant, and the Lady of another; and no one could boast of having taken more *Irish noble blood* than I have, and I am sure they would let me take *a little more* were I to go back.

I have been told that it was *degrading* for an M.D. to practise that minor branch of Surgery (Cupping). But let me ask such gentlemen if procuring relief to any of our fellow-creatures is not exactly fulfilling the part either of the Physician or of the Surgeon, no matter in what manner relief is procured? Therefore, I say that I am proud and happy at any time I have an opportunity of doing good, which I am always sure to do with my Cupping instruments, and no body is more delighted than I (an old Frenchman) as when I receive a *good* fee for my trouble.

I am glad to have an opportunity to state that I have an extensive apparatus of the best finished philosophical instruments, about THIRTY HUNDRED WEIGHT! I would be glad that some Provincial Institution, or some rich *amateur* of science would purchase them from me, and give me the job of using them for their and my instruction and gratification, for I am tired of travelling with them, and I also find that water that runs collects no moss, *(and I want a little of that.)*

I should be glad also to get the conducting of a *good Dispensary;* anything, in fact, to keep me employed and at home. Let me be tried in a general way; and when I cease to give satisfaction, let them that procured me the appointment have done with me.

I am but a Foreigner, it is true; but let me be

allowed to think I have some claim on the British nation. I have been residing among them twenty-two years. My medical qualifications I took in the University of Dublin and Scotland. I passed the Royal College of Surgeons in *London* in 1831. Am connected with a *Scotch* family, from whom I have *a few Irish* descendants! .... Now, will they say I am not entitled to their support?

I will now conclude my *pedigrees* and all good qualities, by stating that I had the honour, in 1834, by command of Her Royal Highness the Duchess of Kent to give Lectures to Her Most Gracious Majesty the Queen of Great Britain at Kensington Palace, and for which I had the honour to receive the most flattering testimonials of approbation. If this (my first public attempt) sells well, I will endeavour to give my readers more.

J. P. SIMON, M.D.

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